NAFTA's Effect on Corn Trade between the United States and Mexico

March 14, 2008

Introduction

The North American Free Trade Agreement (NAFTA) between the United States (U.S.), Mexico, and Canada began on January 1, 1994. Under NAFTA, trade restrictions for agricultural products between the U.S. and Mexico were lifted in 5, 10, and 15-year increments, although many products had trade restrictions lifted immediately upon NAFTA's initiation. All trade restrictions for agricultural products between the U.S. and Mexico were fully lifted on January 1, 2008. Corn was one commodity phased into free trade over a 15-year period. This paper examines Mexico's feedgrain production, consumption, trade, and use as they relate to trade with the U.S., as well as the impact the full implementation of NAFTA has had on these variables. NAFTA's impact on GIPSA inspections of corn to Mexico is also examined.

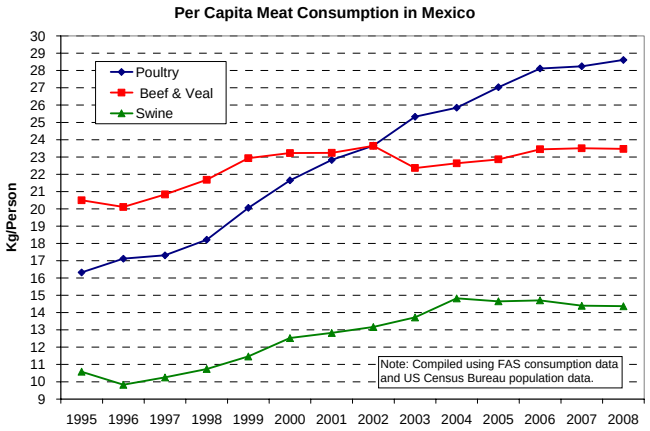
Corn Production and Consumption in Mexico

There are two different types of corn grown in Mexico: yellow corn, very similar to that grown in the United States, and white corn, which is native to Mexico. While both varieties are grown in Mexico, they have different uses, and differ greatly in quantities produced. Mexico's native white corn is estimated to comprise over 90% of the country's 22.5 million metric tones (mmt) of domestic corn production, with yellow corn production expected to be around 2 mmt for the 2007/08 crop year. Unlike the United States, the primary use of domestically produced (white) corn in Mexico is human consumption. For hundreds of years, Mexico has grown white corn for consumption in corn-based tortillas, a food staple that accounted for 7.3% of all food and beverage expenditures in 2004 (Juarez, Trejo, and Nawn, 2007). However, similar to the U.S., yellow corn grown in Mexico is used primarily as animal feed.

Mexico consumes nearly all domestic corn production (both yellow and white varieties), exporting on average less than one half of one percent of annual domestic production. Over the past decade, meat consumption, especially poultry, has increased dramatically. Since 1998, per capita poultry consumption has increased 51%, per capita swine consumption increased 34%, and per capita beef and veal consumption increased 8%.

This increase has resulted in increased feed demand, which contributes greatly to Mexico's increasing corn imports.

In particular, the increases of poultry and swine consumption have resulted in an increasing demand for yellow corn, a primary feedstock for these animals. However, it is interesting to note that per capita consumption of corn (including food, seed, and industrial use), has fallen nearly 6% over the past decade, stagnating in recent years at 144 kg/person, suggesting that for the near future, growth in human corn consumption will be limited to population growth.

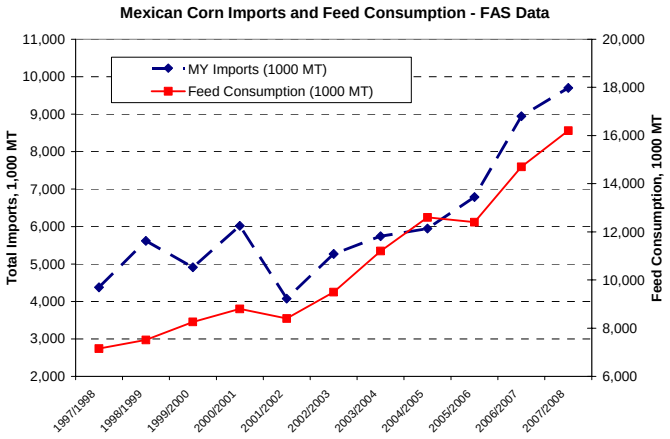


Mexican Corn Trade

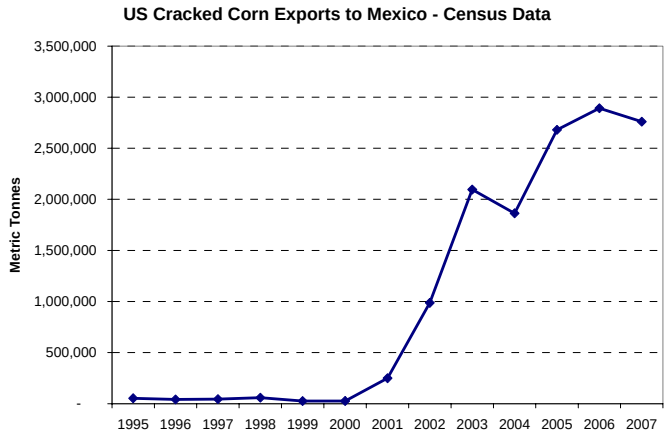
As discussed previously, Mexico produces very little yellow corn, the quantity of which amounts to roughly 11% of domestic feed needs. The remaining 89% of corn used for the country's growing animal feed demand must be imported, and on average, 99.8% of all Mexican corn imports originate from the U.S. Because the U.S. is such an important agricultural trading partner with Mexico, especially regarding the commodity of corn, NAFTA has been an important factor in how corn is imported into Mexico.

Upon implementation of NAFTA in 1994, the Mexican government became obligated to distribute tariff-rate quotas (TRQ) for U.S. corn among domestic Mexican corn importers; whereas previously, the Mexican government was not obligated to allow any U.S. corn into the country. The initial TRQ was set at 2.5 mmt in 1994, and was increased at a rate of 3 percent each year until all trade restrictions were lifted, and the TRQ was no longer applicable on January 1, 2008. Any imports over the NAFTA TRQ were eligible to be taxed at a prohibitive rate specified in the NAFTA agreement (originally 206% in 1994, dropping to 72.6% in 2004, 54.5% in 2005, 36.3% in 2006, 18.2% in 2007, and falling to 0.0% in 2008 with the implementation of free trade).

However, even before NAFTA began in 1994, the Mexican government issued licenses for imports of U.S. corn (primarily yellow corn) in amounts typically over 3.0 mmt to atone for Mexico's small domestic production of yellow corn used for animal feed (Zahniser and Coyle, 2004). After the implementation of NAFTA, and due to the increasing domestic demand for meat, the Mexican government annually issued additional permits beyond the NAFTA-established TRQ, which were subject to small non-prohibitive tariffs of 1-2 percent. Any imports above these permit quantities were subject to the high trade-prohibiting tariffs. Because NAFTA did not allocate a separate TRQ for yellow and white corn imports into Mexico, these trade practices applied to both yellow and white corn imports until 2004. In 2004, the Mexican government, in an effort to protect its domestic white corn industry, decided that white corn imported after the NAFTA TRQ had been filled (but before the additional permits were filled) would be subject to the much higher prohibitive rates. Despite trade barriers, Mexican corn imports have continually increased since 2002.



In the past, issuance of import permits to industry applicants was a politically sensitive matter, often resulting in issuance delays, and in some cases, denials of import permits. As Mexico's demand for U.S. corn grew, both Mexican importers and U.S. exporters began to explore alternatives to Mexican imports of whole/bulk U.S. corn, hoping to circumvent the problem of permit delays, and if possible, avoid the 1-2% tariff (this tariff was only 1% in recent years). Starting in 2001, Mexican imports of cracked U.S. yellow corn began to increase dramatically, from roughly 26,000 metric tonnes (mt) in 2000 to nearly 250,000 mt in 2001, and roughly 2.90 mmt in 2006 (as reported under trade code 1104.23).

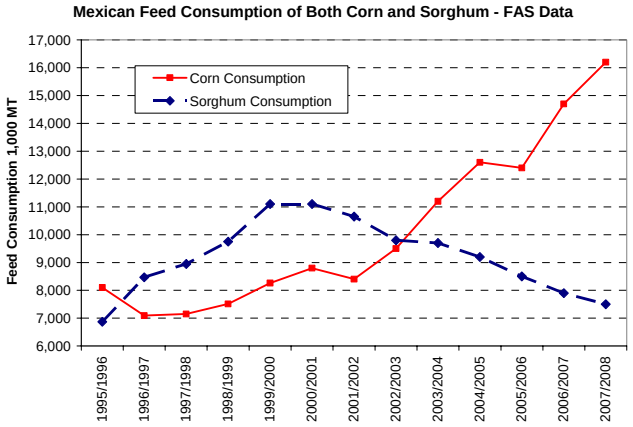


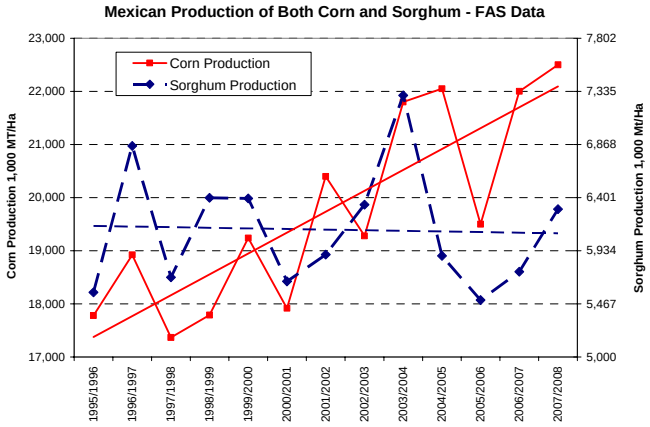
The reason for increased cracked corn shipments was that cracked corn was not viewed as "corn" under NAFTA, but rather an entirely different commodity, for which no trade restrictions (i.e. quotas or tariffs) were in place. As such, the popularity of cracked corn for use as animal feed grew rapidly from 2001-2006.

Sorghum Production and Consumption in Mexico

Sorghum is the other major feed grain consumed in Mexico. As recently as 2003, corn and sorghum use for animal feed was nearly equal, but as shown in the left-hand chart on page 5, since the beginning of this decade, corn has been increasingly substituted for sorghum because of the increased profitability of feeding corn. Industry sources indicate that the price of sorghum must be about 85 percent of the price of corn for the poultry industry to switch to sorghum. Corn is generally preferred over sorghum for poultry feed because of its better nutritional value (Juarez and Trejo, 2005).

Despite reduced sorghum demand, Mexican sorghum production has remained relatively flat given the yield increases that have offset its reduction in planted area. To account for sorghum's reduced feed demand, imports of sorghum, 99% of which originate from the U.S., have decreased. The trends of increasing corn feed use, decreasing sorghum feed use, and shrinking sorghum imports are likely to continue through the near future, although extreme feed grain prices will reduce profitability of the livestock sector, and may slow feed demand growth.





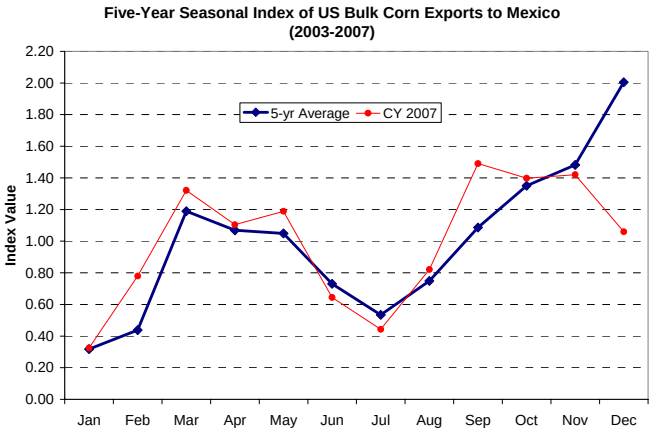
Corn Trade with Full NAFTA Implementation

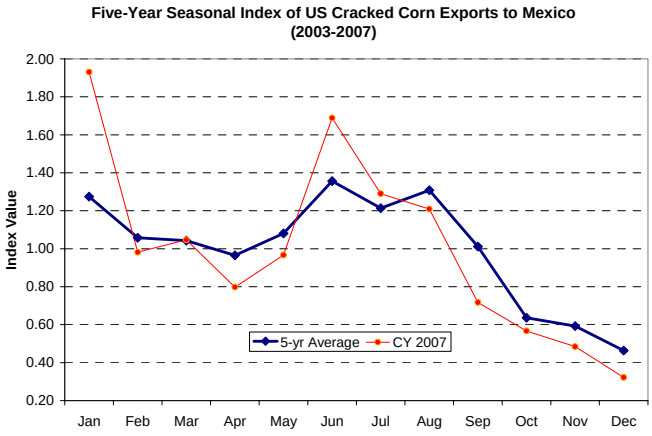
Before the full implementation of NAFTA was completed on January 1, 2008, there was anticipation that U.S. exports of cracked corn to Mexico would fall back to negligible levels, as barriers to whole bulk corn trade would be completely lifted, and U.S. exporters and Mexican imports would no longer be burdened by delayed permit issuances or tariffs. There has also been fear among Mexican corn growers that free trade would result in an influx of U.S. corn, saturating the Mexican corn market and suppressing Mexican corn prices. Both of these preconceptions hold at least some truth. In the case of cracked corn, exports to Mexico have dropped off substantially, and U.S. corn exports to Mexico during January 2008, at 819,348 mt, were the largest quantity of January imports on record. Reasons for both of these occurrences will be discussed.

When examining the effect free trade is having on U.S. corn exports to Mexico, we must first look at the trend of these exports in recent years. As mentioned previously, 99.8% of all corn imports into Mexico originate from the U.S., and due to increased feed demand, these imports have increased dramatically in recent years. Over the past five crop years, the average increase in bulk corn imports has been 986,000 mt. The balance sheet on page 10 shows that imports increased 2.157 mmt from the 2005/06 crop year to the 2006/07 crop year, and USDA's Foreign Agricultural Service (FAS) expects imports to increase 0.756 mmt to 9.700 mmt from the 2006/07 crop year to the 2007/08 crop year.

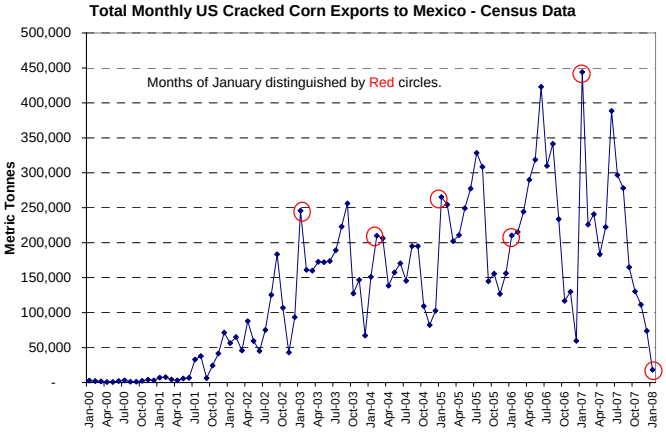
On top of the expected 0.756 mmt increase in imports for the 2007/08 crop year, which all other thing equal should increase monthly imports anyway, other factors have also played roles in making January 2008 corn imports exceptionally large. It seems that in anticipation of free trade starting January 1, 2008, Mexican importers decided to import just enough corn to get them through the month of December 2007, opting to hold out for larger imports in January 2008 to make up for the December decrease. As observed in the following left-hand chart, December corn exports to Mexico were seasonally very

low, and much less than what would have been expected given Mexico's growing feed demand.





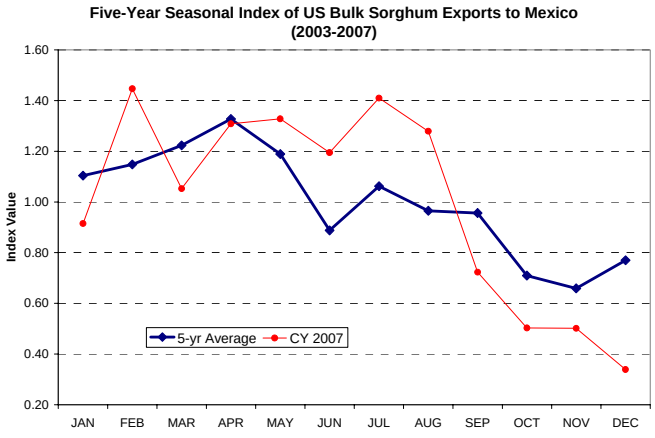
Another factor which played a role in the large January 2008 imports of bulk yellow corn was the sharp decrease in Mexican imports of cracked corn during the same month. Unlike bulk yellow corn exports to Mexico in December, cracked corn exports were in line with seasonal expectations, yet from the right-hand chart above we can also see that since CY 2003, there has been a very strong seasonal tendency for imports of cracked corn in January to be nearly the largest of the year. The following chart shows that imports during January 2008 fell back to insignificant levels at only 18,233 mt, in stark contrast to their seasonal tendency, as traders on both sides of the border no longer need to look for ways to circumvent the problem of permit delays and 1-2% import tariffs on imports of bulk corn.

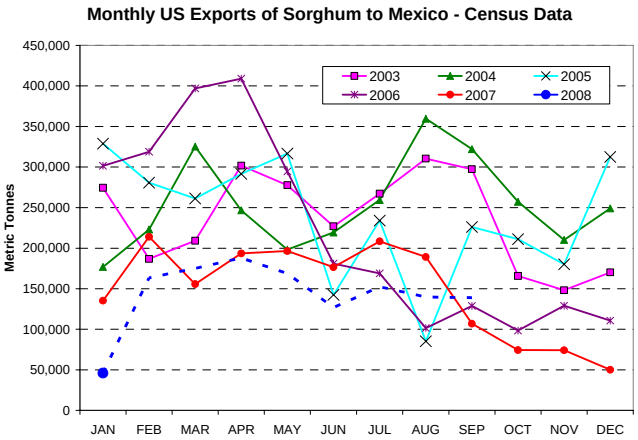


If imports of cracked corn had followed the pattern of recent years, we would have expected cracked corn imports of around 294,005 mt (based on 3-yr average cracked corn imports of 2.778 mmt for 2008 and January seasonal index of 1.27). As such, given the

cracked corn imports of only 18,233 mt, Mexican imports of bulk yellow corn needed to be roughly 276,000 mt more than what they would have been this January to make up for the cracked corn import decrease and sustain the required demand for livestock feeding. Miniscule imports of cracked corn are expected to continue, requiring roughly an extra 2.606 mmt[1] of bulk yellow corn imports during CY 2008 to make up the difference.

A final factor influencing the record January 2008 yellow corn imports into Mexico was the slack import demand of sorghum during December 2007 (shown in the following left-hand chart). Much like what happened with lower than anticipated bulk corn imports during December 2007, sorghum imports were also seasonally low, again, likely in anticipation of free trade starting January 1, 2008. Incidentally, like cracked corn, sorghum was not restricted by tariffs or quotas prior to January 1, 2008. Because corn is the preferable feedstock, importers of sorghum also seemed to import just enough sorghum to get them through December 2007, preferring instead to import larger quantities of corn upon arrival of free trade. Indeed, as shown in the following right-hand chart, sorghum imports during January 2008, like cracked corn imports, were also significantly below where they would have been expected given Mexico's increasing feed demand. However, this may partially be due to escalating feed prices.





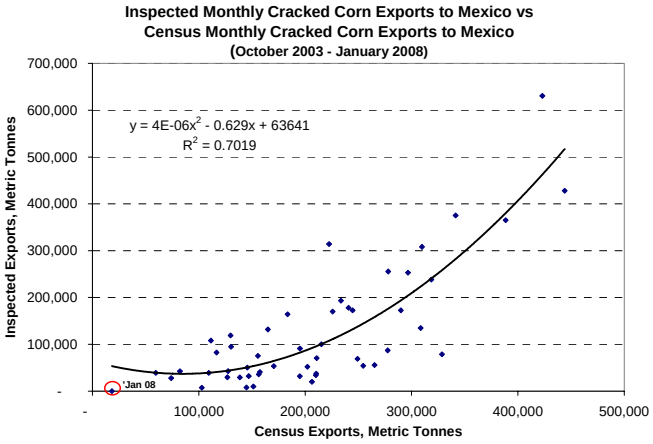
While the general trend of decreasing sorghum use for feed is expected to continue, it is unclear at this point (with only one month of "free trade" data) if Mexico will continue to import small quantities of sorghum as they did in January 2008. FAS is forecasting Mexico to import 1.500 mmt of sorghum for the 2007/08 crop year, down 0.414 mmt from the 1.914 mmt imported during 2006/07. Based on cumulative Oct/Jan imports, the FAS estimate of 1.500 mmt is on track to be achieved, but only if Mexico resumes a more normal sorghum import pattern as represented by the dashed blue line in the right-hand chart above.

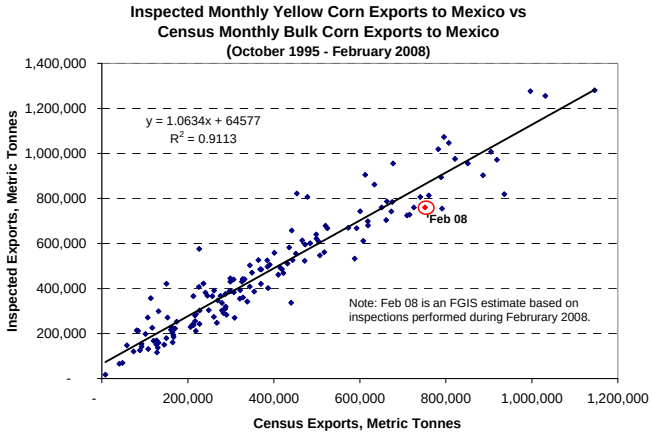
[1] 2.606 mmt calculated by subtracting a seasonal CY 2008 forecast from the previous 3-yr average of CY imports of cracked corn as follows: Subtract the value of: [(January cracked corn imports of 18,233 mt divided by the five-year January index value of 1.27), multiplied by 12] from 2.778 mmt.

After taking into consideration the seasonally low December 2007 corn and sorghum imports, and the additional corn required due to the sharp reduction of cracked corn imports in January 2008, the large volume of bulk corn imports during January 2008 should come as no surprise. In fact, if we examine cumulative Mexican corn imports to date (October 07 – January 08) and compare this quantity to the expected year-end total of 9.70 mmt found in FAS's Mexican corn balance sheet (this historically has been a reasonably accurate gauge for determining if the expected year-end total is on track), FAS's forecast of 9.70 mmt for 2007/08 Mexican corn imports appears to be reasonably accurate.

NAFTA's Effect on GIPSA Inspections

The historic relationships between both monthly GIPSA inspections of cracked and whole (bulk) corn exports and monthly Census export data are presented in the following charts. The charts show there is a more robust relationship between bulk inspections and exports with an R^2 of 0.91, compared to an R^2 of 0.70 for the relationship between cracked corn inspections and exports.

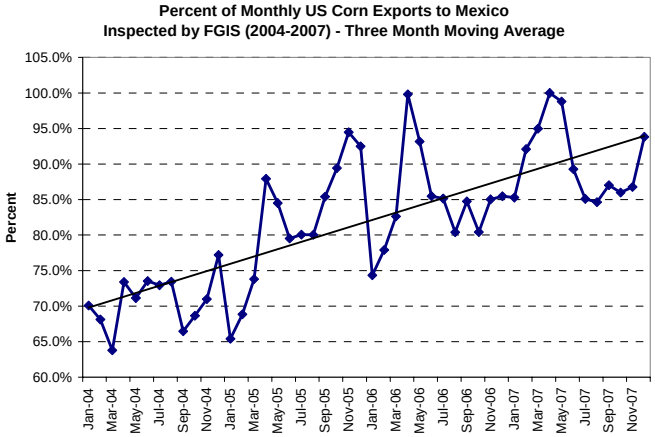


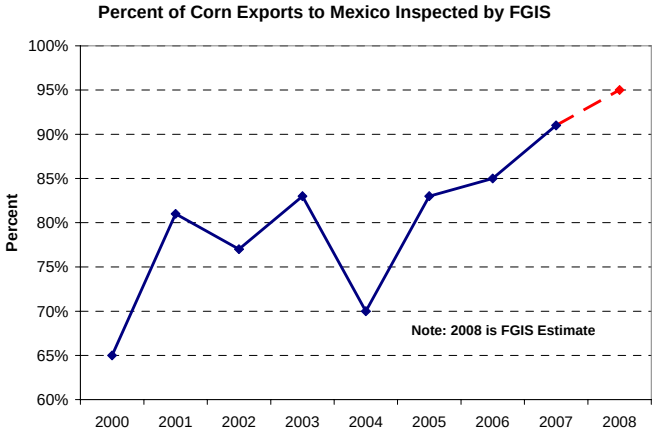


GIPSA conducted no inspections of cracked corn during the month of January, even though there were 18,233 mt of Census cracked corn exports. Recall from the seasonal index chart showing cracked corn exports on page 6 that January, with an index of 1.27, is second only to the months of June (index of 1.36) and August (index of 1.31). Because no inspections for cracked corn were conducted during January, and because January seasonally witnesses some of the largest quantities of cracked corn exported to Mexico, it is reasonable to assume that GIPSA will not be conducting inspections of cracked corn in the foreseeable future.

From 2004-2007, GIPSA inspected, on average, 82% of the quantity of Census reported bulk corn exports to Mexico. However the percent of inspections has been increasing in recent years, to the point that GIPSA inspected 91% of all bulk corn being exported to

Mexico during 2007. Similarly, GIPSA inspected on average 86% of all cracked corn exports to Mexico during 2007.





The right-hand chart above shows the percent of total bulk corn exports to Mexico that have been inspected by GIPSA on an annual basis since 2000. Assuming the annual increase in exports inspected continues to increase during 2008 as it has in recent years, it is reasonable to assume that roughly 95% of all bulk corn exports to Mexico will be inspected by GIPSA. As mentioned earlier, and presented in the balance sheet on the following page (modified to include cracked corn imports and GIPSA inspections), USDA's FAS is forecasting Mexican corn imports during the 2007/08 crop year at 9.700 mmt, which correlates to roughly 9.600 mmt of imports from the U.S. If it is assumed that 95% of these exports will be inspected, this correlates to 9.351[2] mmt of GIPSA inspected corn and cracked corn exports to Mexico. This compares to inspections of 10.439 mmt during Mexico's 2006/07 crop year.

[2] Inspections of 9.351 mmt for the 2007/08 crop year derived by multiplying U.S. export of 9.600 mmt by 95% and adding cracked corn inspections of 0.231 mmt that occurred during Oct/Dec 2007. It is assumed that no additional inspections of cracked corn will occur during the 2007/08 crop year.

Mexican Corn Balance Table (Oct/Sep Crop Years)

	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008
Area Harvested (1000 HA)	7,780	7,030	7,690	7,690	6,640	7,400	7,400
Yield (MT/HA)	2.62	2.74	2.83	2.87	2.94	2.97	3.04
Beginning Stocks (1000 MT)	2,773	3,485	3,327	4,461	4,529	2,707	3,134
Production (1000 MT)	20,400	19,280	21,800	22,050	19,500	22,000	22,500
Imports (1000 MT)	4,076	5,269	5,739	5,945	6,787	8,944	9,700
Imp. from U.S. (1000 MT)	*4,076*	*5,269*	*5,739*	*5,945*	*6,762*	*8,893*	*9,600**
Total Supply (1000 MT)	**27,249**	**28,034**	**30,866**	**32,456**	**30,816**	**33,651**	**35,334**
Exports (1000 MT)	164	7	5	27	209	217	100
Feed Consumption (1000 MT)	8,400	9,500	11,200	12,600	12,400	14,700	16,200
FSI Consumption (1000 MT)	15,200	15,200	15,200	15,300	15,500	15,600	15,800
Total Consumption (1000 MT)	23,600	24,700	26,400	27,900	27,900	30,300	32,000
Ending Stocks (1000 MT)	**3,485**	**3,327**	**4,461**	**4,529**	**2,707**	**3,134**	**3,234**
Stocks-to-Use	**14.7%**	**13.5%**	**16.9%**	**16.2%**	**9.6%**	**10.3%**	**10.1%**
Cracked Corn Imports (1000 MT)	*881*	*1,998*	*1,911*	*2,536*	*3,025*	*2,751*	*449**
Total US Imports (1000 MT)	4,957	7,267	7,650	8,481	9,787	11,644	10,049*
Bulk Corn Inspections (1000 MT)	3,211	4,201	4,356	4,721	5,958	7,939	9,120*
Cracked Corn Inspections (1000 MT)			436	699	2,369	2,500	231**
Total Inspections (1000 MT)	3,211	4,201	4,791	5,419	8,327	10,439	9,351*

Sources: USDA/FAS, FGIS

* FGIS Estimate

** Actual inspections to date - Includes inspections of 94,923 mt in Oct, 107,975 mt in Nov, and 27,906 mt in Dec. No cracked corn inspections have been recorded during Jan & Feb 2008.

While the projected level of total inspections for the 2007/08 crop year is 1.088 mmt less than the 2006/07 crop year, it is important to keep in mind that commodity prices, corn included, are at all-time highs, leading to demand rationing not only in Mexico, but across the globe. For this reason, it is very difficult to make an assessment on the effect of NAFTA's free trade on inspections of corn headed for Mexico, but it can be assumed that record high corn prices are the major culprit of reduced imports, and therefore reduced inspections. This assumption can be weakly argued by the fact that in 2007, 86% of all U.S. cracked corn exports to Mexico were inspected by GIPSA, while 91% of bulk corn exports were inspected. Because cracked corn demand has been replaced by bulk corn due to free trade, and a higher percent of bulk corn was inspected in 2007 compared to cracked corn, it would make sense that the cracked corn demand shifted to bulk corn should be inspected at a higher percent than it would have been in the form of cracked corn. However, this may not be the case, as the buyers of cracked corn who shift to bulk may not desire to have a larger percent of their bulk corn inspected. Nonetheless, the percent inspected would not be expected to drop.

Summary of NAFTA's Effects

From the previous discussion, we know that:

- Mexico has been importing increasing quantities of corn and decreasing quantities of sorghum in recent years.
- Mexico anticipated free trade starting January 2008 by importing less than typical amounts of corn and sorghum in December 2007.
- There has been a sharp decrease in cracked corn imports and a more modest reduction in sorghum imports in January 2008.
- GIPSA inspections for Mexico's 2007/08 crop year are expected to be less than inspections during the 2006/07 crop year, likely as a result of higher commodity prices as opposed to either NAFTA's free trade, or a decrease in the percent of exports inspected.

Imports of cracked corn are likely to continue to be insignificant in the months and years to come, as it is now more cost-efficient for Mexican users to import bulk corn after NAFTA's full implementation on January 1, 2008. At this point in time, it is unclear whether or not sorghum imports will continue at reduced levels, but FAS is currently forecasting (as of March 11, 2008) a 0.414 mmt reduction in sorghum imports for the 2007/08 crop year at 1.500 mmt. Mexican imports of bulk U.S. yellow corn will continue to increase as a result of their annual demand increase, and also due to the switch from cracked corn to bulk corn. The potential for corn to displace a larger than expected share of sorghum feed demand also exists.

References:

Juarez, Benjamin, and Sal Trejo. *Mexico Grain and Feed Annual Report 2005*. U.S. Department of Agriculture, Foreign Agricultural Service, Global Agriculture Information Network (GAIN) Report No. MX5022, March 9, 2005. Available at: http://www.fas.usda.gov/gainfiles/200503/146119247.pdf

Juarez, Benjamin, Sal Trejo, and Jeff Nawn. *Mexico Grain and Feed Annual Report 2007*. U.S. Department of Agriculture, Foreign Agricultural Service, Global Agriculture Information Network (GAIN) Report No. MX7024, March 28, 2007. Available at: http://www.fas.usda.gov/gainfiles/200703/146280676.pdf

Zahniser, Steven, and William Coyle. *U.S.-Mexico Corn Trade During the NAFTA Era: New Twists to an Old Story*. U.S. Department of Agriculture, Economic Research Service, Electronic Outlook Report No. FDS-04D-01, May, 2004. Available at: http://www.ers.usda.gov/publications/FDS/may04/fds04D01/fds04D01.pdf